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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,047	10/28/2003	Norio Kimura	2003-1482	3900

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EXAMINER	
ELEY, TIMOTHY V	

ART UNIT	PAPER NUMBER
3724	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/694,047	KIMURA ET AL.	
	Examiner	Art Unit	
	Timothy V. Eley	3724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/04/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 3,6,8,11,12,15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al(6,167,583) in view of Miyashita et al(5,993,639).

- Miyashita et al(6,167,583) discloses a polishing apparatus comprising; a polishing section for polishing a surface of a substrate by holding the substrate and pressing the substrate against a polishing surface(64), the surface of the substrate having a semiconductor device thereon; and a cleaning section(65) for cleaning at least a polished surface of the substrate while supplying electrolyzed water by a supply device(28) to the substrate generated by an electrolyzed water generator(see column 4, lines 65-end), and a diluted hydrofluoric acid supply device(27) for supplying diluted hydrofluoric acid to the polished surface of the substrate, since any ingredients may be applied by the supply devices(27,28). Whether or not a metal-oxide film is formed on the polished surface of the substrate by the electrolyzed water and dissolved by the hydrofluoric acid would depend upon the exact type of structure of the semiconductor device. However, the Miyashita et al apparatus is capable of performing this feat. Also, electrolyzed water may be supplied to the polished surface by supply device 28, and than

the substrate may be turned over and hydrofluoric acid supplied to the polished surface. See figures 1,2, and 6; column 1, lines 6-21, column 7, lines 23-44, and column 8, lines 3-32.

- Miyashita et al(6,167,583) does not a measuring device for monitoring pH or ion concentration of the electrolyzed water, and a controller for controlling the pH or ion concentration of the electrolyzed water generated by the electrolyzed water generator.
- Miyashita et al(5,993,639) discloses a polishing apparatus which includes an electrolyzed water generator for generating electrolyzed water, a measuring device for monitoring pH or ion concentration of the electrolyzed water, and a controller for controlling the pH or ion concentration of the electrolyzed water generated by the electrolyzed water generator, thereby providing electrolyzed water for cleaning a substrate. See specifically the abstract.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Miyashita et al(6,167,583) apparatus by providing a measuring device for monitoring pH or ion concentration of the electrolyzed water, and a controller for controlling the pH or ion concentration of the electrolyzed water generated by the electrolyzed water generator, thereby providing the appropriate electrolyzed water for cleaning a substrate as taught by Miyashita et al(5,993,639).

- Regarding claim 3, Miyashita et al(6,167,583) discloses an ultrasonic transducer for applying ultrasonic vibrations to the electrolyzed water before supplying the electrolyzed water to the substrate. See column 3, lines 63-end.
- Regarding claim 8, Miyashita et al(6,167,583) discloses a polishing section for polishing a surface of a substrate by holding the substrate and pressing the substrate against a polishing surface, the surface of the substrate having a semiconductor device thereon. See column 7, lines 34-43.

3. Claims 1,2,5,7,9,10,13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al(6,167,583) in view of Miyashita et al(5,993,639), as applied to claims 3,6,8,11,12,15, and 16 above, and further in view of Hayashi et al(6,379,230).

- Miyashita et al(6,167,583) in view of Miyashita et al(5,993,639) is explained above.
- Miyashita et al(6,167,583) as modified does not specifically disclose a top ring for holding the substrate(claim 1), nor another polishing surface for conducting a secondary polishing of the polished surface(claim 7).
- However, Hayashi et al discloses that it is well known in the art to use a top ring for holding a substrate and pressing it against a polishing surface(see figures 2,4 and 5), and at least two polishing surfaces for conducting several polishing steps on a polished surface. See figure 3.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the Miyashita et al apparatus by using a top ring for holding the substrate against the polishing surface, and providing another polishing surface for conducting a secondary polishing of the polished surface in order to optimize polishing of the semiconductor as taught by Hayashi et al.
- Regarding claim 2, Miyashita et al(6,167,583) discloses supply device 27 and 28 for supplying ingredients to front and back surfaces of a substrate. The exact number of supply devices used to supply ingredients to the substrate would have been obvious to one having ordinary skill in the art at the time the invention was made, since clearly only two supply devices are needed because the water and acid are not supplied simultaneously, but in sequence as stated in applicant's disclosure and claims, and as mentioned in Miyashita et al(6,167,583).
- Regarding claims 5, the apparatus is capable of processing a substrate having a copper layer.

Response to Arguments

4. Applicant's arguments filed October 18, 2005 have been fully considered but they are not persuasive.

- Applicant argues that the prior art cited by the Examiner does not disclose or suggest both an electrolyzed water supply device

for supplying electrolyzed water to the polished surface of the substrate and a diluted hydrofluoric acid supply device for supplying diluted hydrofluoric acid to the polished of the substrate to dissolve the metal-oxide film formed on the polished surface of the substrate and remove the metal-oxide film from the polished surface of the substrate, the polished surface being a single surface.

- o However, Miyashita et al(6,167,583) discloses supply devices 27 and 28 which may be used to supply either electrolyzed water and/or hydrofluoric acid. Also, the substrate may be turned over after any particular fluid is applied to a surface thereof, and than an additional fluid may be applied to the same surface. Applicant is merely reciting intended use, which is capable of being performed by the Miyashita et al(6,167,583) apparatus as modified.

- Applicant argues that there is no additional supply device for supplying a process liquid to the lower surface of the semiconductor wafer.
  - o However, Miyashita et al(6,167,583) discloses applying process liquid to front and back surfaces of a wafer, and the exact number of supply devices would have been obvious to one having ordinary skill in the art at the time the invention was made since clearly only one process liquid is to be supplied at a time by applicant. Further, applicant has not provided any convincing reasoning as to why more

than one supply device is needed since clearly only one process liquid is to be supplied at a time. Furthermore, even if applicant were to provide a reason for separate supply devices(as recited in claim 2), to use separate supply devices in Miyashita et al would have been obvious to one having ordinary skill in the art at the time the invention was made since such a modification would eliminate the need to clean the pipes 5 and/or 6.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Taoki et al(5,635,053) discloses cleaning substrates using electrolyzed water and hydrofluoric acid.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy V. Eley whose telephone number is 571-272-4506. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Allan N. Shoap can be reached on 571-272-4514. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy V Eley
Primary Examiner
Art Unit 3724

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